IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original) An integrated circuit comprising:

a register to store a threshold temperature value;

a thermal sensor; and

clock adjustment logic to decrease a clock frequency in response to the thermal sensor indicating that the threshold temperature value has been exceeded.

Claim 2 (Original) The integrated circuit of Claim 1 further comprising:

threshold adjustment logic to increase the threshold temperature value to a new threshold temperature value in response ot the thermal sensor indicating that the threshold temperature value has been exceeded.

Claim 3 (Original) The integrated circuit of Claim 2 wherin the threshold adjustment logic is further to increase the new threshold temperature in response to the thermal sensor indicating that the new threshold temperature has been exceeded.

Claim 4 (Original) The integrated circuit of Claim 3 wherein the threshold adjustment logic is further to lower the new threshold temperature to detect decreases in temperature.

Claim 5 (Original) The integrated circuit of Claim 1 wherein the clock adjustment logic is to increase the clock frequency after a predetermined duration.

Claim 6 (Original) The integrated circuit of Claim 1 wherein the clock adjustment logic is to increase the clock frequency in response to the thermal sensor indicating that the sensed temperature is less than the threshold temperature.

Claim 7 (Original) The integrated circuit of Claim 1 further comprising a fail-safe sensor and halt logic to halt operation of the integrated circuit in response to the fail-safe sensor indicating that a fail-safe threshold temperature has been exceeded.

Claim 8 (Original) The integrated circuit of Claim 7 wherein the halt logic is to inhibit operation of the integrated circuit by stopping a clock of the integrated circuit.

Claim 9 (Original) The integrated circuit of Claim 7 wherein the fail-safe threshold temperature is a predetermined fixed critical temperature.

Claim 10 (Original) The integrated circuit of Claim 1 wherein the thermal sensor comprises a plurality of thermal sensors placed across the integrated circuit and an averaging mechanism to calculate an average temperature from the plurality of thermal sensors.

Claim 11 (Original) The integrated circuit of Claim 1 further comprising an interrupt handler to display information regarding the sensed temperature to a user of the integrated circuit.

Claim 12 (Original) The integrated circuit of Claim 1 further comprising interrupt logic to generate a first interrupt I the calculated average temperature exceeds a first threshold and a second interrupt if the calculated average temperature exceeds a second threshold.

Claim 13 (Original) The integrated circuit of Claim 1 wherein the clock adjustment logic executes instructions to vary the frequency of a clock signal of the integrated circuit in response to the thermal sensor.

Claim 14 (Original) The integrated circuit of Claim 1 wherein the clock adjustment logic executes instructions to provide closed loop control of the integrated circuit clock frequency, thereby automatically reducing the temperature when overheating occurs.

Claim 15 (Original) The integrated circuit of Claim 1 further comprising interrupt logic to activate an active cooling device in response to the thermal sensor.

Claim 16 (Currently Amended) A method comprising:

storing a threshold temperature value in a register <u>of an integrated circuit</u>;

sensing the temperature within [[an]] <u>the</u> integrated circuit; and

decreasing a clock frequency of the integrated circuit in response to the sensed temperature exceeding the threshold temperature value.

Claims 17 (Original) The method of Claim 16 further comprising:

increasing the threshold temperature value to a new threshold temperature value in response to the sensed temperature exceeding the threshold temperature value.

Claim 18 (Original) The method of Claim 17 further comprising increasing the new threshold temperature in response to the sensed temperature exceeding the threshold temperature value.

Claim 19 (Original) The method of Claim 16 further comprising lowering the new threshold temperature to detect decreases in temperature.

Claim 20 (Original) The method of Claim 16 further comprising increasing the clock frequency after a predetermined duration.

Claim 21 (Original) The method of Claim 16 further comprising increasing the clock frequency in response to the sensed temperature being less than the threshold temperature.

Claim 22 (Original) The method of Claim 16 further comprising displaying information regarding the sensed temperature to a user of the integrated circuit.

Claim 23 (Original) The method of Claim 16 further comprising executing instructions to vary the frequency of a clock signal of the integrated circuit in response to the sensed temperature.

Claim 24 (Original) The method of Claim 16 further comprising executing instructions to provide closed loop control of the integrated circuit clock frequency, thereby automatically reducing the temperature when overheating occurs.

Claim 25 (Previously Presented) A microprocessor comprising:

a register storing a register value corresponding to a threshold temperature;

a programmable thermal sensor receiving the register value, wherein the programmable thermal sensor generates a first interrupt signal when an internal microprocessor temperature exceeds the threshold temperature corresponding to the register value;

clock circuitry to provide a clock signal for the microprocessor; and a processor unit coupled to the clock circuitry, wherein the processor unit executes instructions to vary the frequency of the clock signal in response to the first interrupt signal.

Claim 26 (Original) The microprocessor of claim 25 further comprising a fail-safe thermal sensor generating a fail-safe interrupt signal if the microprocessor temperature exceeds a fail-safe threshold temperature, wherein the processor unit is halted in response to the fail-safe interrupt signal.

Claim 27 (Original) The microprocessor of claim 25 wherein the clock circuitry further comprises a phase locked loop.

Claim 28 (Original) The microprocessor of claim 25 wherein the thermal sensor comprises:

a current source;

a voltage reference coupled to the current source to provide a bandgap reference voltage, wherein the bandgap reference voltage is substantially constant over a range of temperatures;

programmable circuitry providing an output voltage varying with the microprocessor temperature in accordance with the register value; and

a comparator, wherein the comparator generates the first interrupt signal if a difference between the output voltage and the bandgap reference voltage indicates that the threshold temperature has been exceeded.

Claim 29 (Original) The microprocessor of claim 28 wherein the programmable circuitry further comprises:

a transistor coupled to the current source to provide the output voltage, a gain ratio of the output voltage to a junction voltage of the transistor controlled by a transistor bias, wherein the junction voltage varies in accordance with a junction temperature of the transistor, the junction temperature corresponding to the microprocessor temperature, a bias circuit providing the transistor bias to control the gain ratio, wherein the output voltage varies with the microprocessor temperature in accordance with the register value.

Claim 30 (Original) The microprocessor of claim 29 wherein the bias circuit further comprises binary weighted resistors.

Claim 31 (Original) The microprocessor of claim 25 wherein the processor executes instructions to reduce a frequency of the clock signal in response to the first interrupt signal.

Claim 32 (Original) The microprocessor of claim 25 wherein the processor executes instructions to provide closed loop control of the microprocessor clock frequency, thereby automatically reducing the temperature when overheating occurs.

Claim 33 (Original) The microprocessor of claim 25 wherein the clock circuitry further comprises:

a first clock;

a frequency divider coupled to the first clock to provide the clodk signal, the frequency divider reducing a frequency of the clock signal in response to the interrupt signal; and a second clock circuit coupled to provide the clock signal to the microprocessor.

Claim 34 (Original) The microprocessor of claim 25 wherein the processor unit programs the register with another register value corresponding to another threshold temperature in response to the first interrupt signal.

Claim 35 (Currently Amended) A method of controlling a temperature of a microprocessor, comprising:

storing threshold temperature values in a register of the microprocessor;

generating a temperature signal within the microprocessor indicative of the temperature of the microprocessor;

comparing the temperature signal with a first threshold temperature level within the microprocessor;

generating an interrupt signal if the temperature signal indicates that the first threshold temperature level has been exceeded; and

decreasing a microprocessor clock frequency in response to the interrupt signal.

Claim 36 (Original) The method of claim 35 further comprising:

comparing the temperature signal with a second threshold temperature level, wherein the second threshold temperature level represents a fail-safe temperature; and halting the microprocessor, if the temperature signal indicates that the second threshold temperature level has been exceeded.

Claim 37 (Original) The method of claim 35 further comprising:

generating a fail-safe interrupt signal if the microprocessor temperature exceeds a fail-safe threshold temperature; and

halting the microprocessor in response to the fail-safe interrupt signal.

Claim 38 (Original) The method of claim 35 wherein generating a temperature signal comprises:

providing a bandgap reference voltage, that is substantially constant over a range of temperatures;

providing an output voltage varying with the microprocessor temperature in accordance with a stored register value; and

wherein generating an interrupt signal comprises generating the first interrupt signal if a difference between the output voltage and the bandgap reference voltage indicates that the threshold temperature has been exceeded.

Claim 39 (Original) The method of claim 35 further comprising providing closed loop control of the microprocessor clock frequency, thereby automatically reducing the temperature when overheating occurs.

Claim 40 (Original) The method of claim 35 further comprising programming the microprocessor with a second threshold temperature.